Appendix G: Vendor-Specific DCE Considerations

This appendix contains vendor-specific and version-specific DCE information. It will be updated as either vendors modify DCE products, or as the definition of DCE changes.

G-1. DCE 1.1 Features

DCE Version 1.1, released in November 1994 by the Open Software Foundation (OSF), is primarily an "improvement" release that makes DCE easier to deploy and use. There are improvements in serviceability and administration, and Version 1.1 provides more nearly complete compliance with international standards. One administrative improvement is the DCE Control Program (`dcecp`) with a task-oriented command language that combines multiple, complex administrative steps into a single command. Version 1.1 also includes a DCE Host Configuration Agent to automate remote start-up/shut-down and provide remote access to security and configuration data.

Performance improvements in Version 1.1 include the following:

- support for consistent auditing across both the time and security services,
- a new IDL compiler features to increase performance and support internationalization,
- Generic Security Services API (GSSAPI) support for non-RPC applications,
- improvements to the Global Directory Services to improve programming and administration, and
- security registration extensions to support non-Unix systems.

> **Note:** Many DCE texts do not yet address DCE Version 1.1. Developers should consult OSF or vendor literature to make full use of the DCE Version 1.1 features available in the DII COE.

DCE 1.1 features of particular interest are described below. These features may be of benefit to DII application developers. For more information refer to the *OSF/DCE Application Development Guide - Introduction and Style Guide*.

G-1.1 Serviceability

Serviceability is a set of features that provides a uniform means of managing a server's diagnostic information. DCE defines a set of levels and a means of controlling the destination of generated output based on these levels. By incorporating these interfaces, an application can be better supported/serviced and diagnosed when necessary.

- Production-quality DII servers shall make use of the serviceability features to simplify the presentation of management information.

> **Note:** Serviceability initialization is included within the initialization interfaces provided in the DII COE**.**

G-1.2 DCE Messaging

DCE incorporates a facility for internationalizing textual messages. Messaging is almost always used for client applications, since the messaging API's deal with the

internationalization of messages intended for display to the user. If a DII application is intending to use a non-US/ASCII language, this facility should be considered.

G-1.3 Backing Store/Database Library

DCE provides a library of routines for managing a persistent backing store or database of objects. Any data structure that can be described in IDL can be stored in the database, indexed by key or by UUID. The primary purpose for the routines is for servers to store information that must persist between executions. The fact that the information is encoded in IDL ensures that it is stored in a format that is transportable between heterogeneous systems. If a requirement for this functionality exists, it should be used. These functions are not efficient or robust enough to be used for general database programming.

G-2. Ada

Several organizations have developed Ada bindings to DCE services. GTE has created a set of Ada bindings to the DCE RPC and threads as part of the U.S. Army Common Hardware and Software-2 (CHS-2) program. These are "thin" bindings; they are one-for-one implementations of the functions in the RPC and Threads libraries, with appropriate conversions for composite types (e.g., between Ada `Strings` and C `char*` s). The host/target was a Sun SPARCstation 20 (also tested on a SPARCstation 10) using SunAda 2.1(g) and Transarc DCE 3.0 (b) libraries.

One of the biggest problem working with Ada and DCE is the issue of threads. Some organizations have been working with Ada vendors to deal with threads and Ada bindings. The U.S. Army, in the CHS-2 program, has done work on the Ada/DCE issues.

Contact the DII COE Chief Engineer for more information on Ada and DCE.

G-3. COTS Development Tools

There are a number of COTS products that can be used in the development of DCE applications. The list presented here is not intended to be exhaustive and only provides a brief overview of the products themselves. Current detailed information is available from the OSF World-Wide-Web page at *http://www.osf.org*, or from specific vendors.

> **Note:** This section is provided for information only. The mention of a product does not constitute an endorsement of the product, and the omission of a product does not imply a lack of suitability of the product.

Table G-1 below lists several commercially available products to aid in maximizing the use of DCE, and simplifying development. Products are presented alphabetically by product name.

PRODUCT NAME	COMPANY	FUNCTION
CodeCenter & ObjectCenter	Centerline Software, Inc.	Programming Environment
Distributed **A**pplication **T**est **E**nvironment (DATE)	BULL Worldwide Information Systems	Application Test Tool
Dcegen	Learning Works, Inc.	Code Generating Tool
Encina	Transarc Corporation	Development Tools
Entera	Open Environment Corporation	Integration & Development Environment
HP OODCE/9000	Hewlett Packard Corporation	Development Tools
Insure++	ParaSoft Corp	Testing Tool
Micro Focus COBOL	Micro Focus	COBOL Toolkit for DCE
OBJECTIQ-DF	Hitachi America, Ltd	Development Environment
PowerBuilder	Powersoft Corporation	Development Environment
Purify, PureCoverage, Quantify, Purelink	Pure Software	Development Tools
RPCpainter for PowerBuilder	Greenbrier & Russell	Development Tool

Table G-1: DCE-Related COTS Products

CodeCenter and Object Center
(Centerline Software, Inc.)

CodeCenter is used for prototyping, building, testing, debugging, enhancing, and maintaining Unix C programs. It includes CenterLine-C, an incremental linker, an automatic runtime and static error detection system, an integrated debugger, dynamic graphical browsers and other tools in an integrated system. ObjectCenter is an advanced C++ compilation system. It includes a C++ runtime error detection system, a C++ and C interpreter, an incremental linker, and the CenterLine C++ compiler. DCE applications can be developed using the CenterLine-C compiler and the ObjectCenter C++ compiler. Both compilers have been tested with Transarc's DCE product offerings for the SUN platform.

Platforms supported:	HP HP-UX
	SUN SunOS
	SUN Solaris
For more information contact:	Coco Jaenicke
	Centerline Software, Inc.
	10 Fawcett Street
	Cambridge, MA 02138

Phone: (617) 498-3377
E-mail: *coco@centerline.com*

Distributed Application Test Environment (DATE)
(Bull Worldwide Information Systems)

DATE is a test environment that generates test drivers. Developers of DCE applications define the client/server interface using the Interface Definition Language (IDL). DATE processes the IDL file to automatically generate a client test Driver. The test drivers provide:

- interactive test capabilities through a graphical user interface (GUI),
- playback and record facilities,
- performance measurements, and
- automated regression testing.

Platforms supported:	IBM AIX
(Check with the vendor for other platform information.)	
For more information contact:	Diane Riemer
	Bull Worldwide Info. Systems
	300 Concord Road
	Billerica, MA 01821

Phone: (508) 294-4366

Dcegen
(Learning Works, Inc.)

Dcegen is a code generation tool that creates DCE client and server code. The dcegen tool allows the user to create the DCE parts of the client and server program by selecting the type of security and the registration methods to be employed in the application. The dcegen program reads parameters selected in a configuration file and creates the server registration and access checking code which the user links with the server half of the application. It creates the client half of the DCE code by automatically assigning the security methods chosen to the binding handles requested. This tool performs the same functions as the rpcgen tool in the ONC or Sun RPC system.

Platforms supported:	HP HP-UX
	IBM OS/2 & AIX
	MS Windows 3.x
	SUN SunOS & SUN Solaris
For more information contact:	Clay Boyd
	Learning Works, Inc.
	11403 Taterwood Drive
	Austin, TX 78750-2538

Phone: (512) 258-2729   **Fax:** (512) 258-1215

Encina
(Transarc Corporation)

The Encina product family builds upon the basic services supplied by the OSF DCE, and extends DCE to provide a rich set of facilities for distributed transaction processing. At a high level, these facilities are divided into the Encina Toolkit, which implements the fundamental services for executing distributed transactions and managing recoverable data, and various Encina extended services.

The components that make up the Encina Toolkit are the following:

- **Encina Base Services**. The Encina Base Services module provides services that permit a node to initiate, participate in, and commit distributed transactions.

- **Encina Server Core**. The Encina Server Core provides facilities for managing recoverable data (i.e., data that is accessed and updated transactionally).

The key components of the Encina Extended Services are:

- **Encina Monitor**. The Encina Monitor is a full-featured transaction processing monitor that provides a powerful, reliable environment for the development, execution, and administration of distributed transaction processing applications.

- **Encina Structured File Server (SFS)**. The SFS is a record-oriented file system that provides full transactional integrity, high performance, and log-based recovery for fast restarts.

- **Encina Recoverable Queuing Service (RQS).** RQS enables the transactional enqueuing and dequeuing of data, allowing transactional tasks to be queued for later processing while ensuring that system failures do not result in lost information. RQS provides multiple levels of priority, and readily scales to support large numbers of users and high volumes of data.

- **Encina PPC Executive.** The PPC Executive supports transactional peer-to-peer communications using the CPI-C and CPI-RR application programming interfaces to provide LU6.2 connectivity over TCP/IP.

It has been recommended that Encina be implemented with DCE to provide basic services like queuing and transaction monitoring. Developers who anticipate the need for Encina services should contact the Engineering office to determine Encina availability.

For more information contact:	John Ryan
	Federal Account Executive
	Transarc Corporation
	6551 Loisdale Court, Suite 950
	Springfield, VA 22150
Phone: (703) 924-0283	**Fax:** (703) 924-9586
E-mail: *jryan@transarc*	**URL:** www.transarc.com

Entera
(Open Environment Corporation)

Entera is a heterogeneous integration environment for developing DCE and Encina server applications. Entera uses a three-tier client/server architecture based on the OSF DCE to enable the development and deployment of heterogeneous integrated applications. Entera generates the interfaces that tie applications together. Entera can be used to:

- encapsulate existing applications to convert them into DCE application services,
- generate new DCE application servers, and
- generate DCE interfaces for popular GUI tools and languages.

Entera provides DCE stub support for languages such as Visual Basic, Powerbuilder, Smalltalk and COBOL.

Platforms supported:	DEC Unix & DEC Windows NT
	HP HP-UX
	IBM OS/2 & IBM AIX
	MS Windows 3.x & NT
	SUN Solaris
For more information contact:	Anne Thomas
	Open Environment Corporation
	25 Travis Street
	Boston, MA 02134
Phone: (617) 562-0900	**Fax:** (617) 562-0038
E-mail: *inf@oec.com*	

HP OODCE/9000
(Hewlett Packard)

HP OODCE frees developers from the DCE API and enables them to access and manage DCE services through a set of pre-defined C++ objects that encapsulate multiple DCE commands. A programmer can use OODCE/9000 objects as building blocks for rapid DCE development. Examples of OODCE/9000 objects include the Global Server Object and Access Control List Database Manager Object.

Platforms supported: HP HP-UX
Other platforms supported--check with Vendor.

For more information contact: Bruce Talley
Hewlett Packard
19111 Pruneridge Avenue
Cupertino, CA 95014

Phone: (408) 447-1830   **Fax:** (408) 447-1831
E-mail: *Bruce-Talley@HP4700.DESK.HP.COM*

Insure++
(ParaSoft Corporation)

Insure++ automatically detects large classes of programming and runtime errors. It is able to debug multi-threaded applications in a DCE environment. Insure++ can be used to find the following types of errors:

- memory reference errors,
- library interface errors, and
- algorithmic anomalies, bugs, and deficiencies

Platforms supported: SUN Solaris
IBM AIX
DEC Alpha
(Check with the vendor for other platform information.)

For more information contact: Scott Timmons
Parasoft Corporation
2031 S. Myrtle Ave.
Monrovia, CA 91016

Phone: (818) 305-0041   **Fax:** (818) 305-9048
E-mail: *sct@parasoft.com*   **URL:** www.parasoft.com

Micro Focus COBOL
(Micro Focus)

MicroFocus has toolkits to provide support for COBOL programming for DCE. The COBOL toolkit for DCE includes application development tools to enable existing COBOL applications to use DCE without having to modify source code or define interfaces. It also includes a COBOL API to DCE services to ease DCE application development, a high-level API to make DCE programming easier, and a COBOL IDL compiler to allow definitions of interfaces using COBOL data types. The Micro Focus COBOL Toolbox for Unix includes a cross-platform COBOL compiler, an interactive debugger and an integrated set of programmer productivity aides and utilities.

Platforms supported:	Windows
	Unix

(Check with the vendor for more specifics.)

For more information contact:	Micro Focus Sales
	2465 East Bayshore Road
	Palo Alto, CA 94303

Phone: (415) 856-4161   **Fax:** (415) 856-6134

OBJECTIQ-DF
(Hitachi America, Ltd)

OBJECTIQ-DF (distributed facility) is based upon the OSF DCE remote procedure call. Client programs call procedures in server (remote) programs as if the procedures were at the client. All objects appear local to a developer. Messages are passed between objects whether they are resident at the client or server. This is accomplished during development as OBJECTIQ-DF generates IDL (Interface Definition Language) descriptions saving the developer from having to code low-level IDL programs.

Platforms supported:	HP HP-UX
	IBM-AIX
	SUN Solaris

For more information contact:	Steven L. Wentworth
	Hitachi America, Ltd
	437 Madison Avenue
	33rd Floor
	New York, NY 10022

Phone: (212) 702-1500   **Fax:**   (212) 751-6368
E-mail: *Swentworth@hal-com.mhs.compuserve.com*

PowerBuilder
(Powersoft Corporation)

PowerBuilder is a powerful, easy to use environment for building graphical client/server applications. PowerBuilder is designed for MIS software developers to create applications that integrate fully with high-performance, relational database servers in a transaction processing environment. PowerBuilder applications can invoke DCE RPC-based services using the Windows version of DCE.

Platforms supported:	DEC Windows NT
	MS Windows 3.x & NT
	SUN Solaris
For more information contact:	Corporate Sales
	Powersoft Corporation
	561 Virginia Road
	Concord, MA 01742
Phone: 800-395-3525	**Fax:** (508) 369-3997

Purify, PureCoverage, Quantify, Purelink
(Pure Software)

Pure Software makes a family of products for developing, debugging, and testing C and C++ programs in a DCE environment. The suite includes:

- **Purify**. Purify provides runtime error checking and memory leak detection throughout C and C++ programs. Purify is thread aware and can provide DCE developers runtime error information on their threaded applications.

- **PureCoverage**. PureCoverage identifies code that has not been executed in applications, including third-party and shared libraries. PureCoverage is thread safe and can be used with threaded applications.

- **Quantify**. Quantify is a performance analysis tool that provides accurate and comprehensive performance data for an application. It is thread aware and provides composite performance information of all the threads defined in an application as well as performance data on a specific thread.

- **PureLink.** Purelink is a linker that cuts build time by identifying what has been changed and only relinks those portions of code.

Platforms supported:	HP HP-UX
	SUN SunOS
	SUN Solaris

For more information contact: Pamela Roussos
Pure Software
1309 South Mary Avenue
Sunnyvale, CA 94087

Phone: (408) 524-3033   **Fax:** (408) 720-9200
E-mail: *Roussos@pure.com*

RPCpainter for PowerBuilder
(Greenbrier & Russell)

RPCpainter supports 3-tiered architecture by offering a seamless interface between PowerBuilder and the DCE RPC. RPCpainter functions include:

- a graphical tool for preparing and editing remote procedure interface definitions,
- automatic generation of RPC stubs for the server,
- automatic generation of RPC objects in a PowerBuilder Library for the client,
- automatic population of DataWindows with RPC results, and
- automatic upload of DataWindow changes through RPCs

Platforms supported: HP HP-UX
IBM AIX
MS Windows 3.x & NT
SUN Solaris

For more information contact: Scott Mitchell
Greenbrier & Russell, Inc.
1450 E. American Lane
Suite 1640
Schaumburg, IL 60173

Phone: (708) 706-4000